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(71) Applicant
jmh Holdings Limited

(Incorporated in United Kingdom)

Stone Circle Road, Round Spinney, Northampton
NN3 4RS

(72) Inventor
David Eric Marshall

(74) Agent and/or Address for Service
Mathisen Macara & Co,
The Coach House, 6-8 Swakeleys Road, Ickenham,
Uxbridge UB10 8BZ

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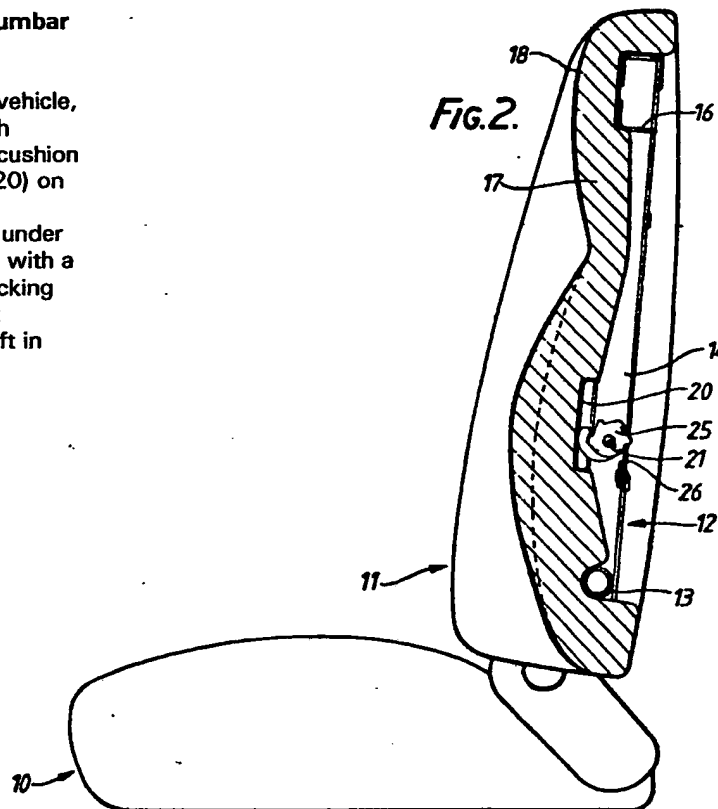
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(54) A seat with a movable lumbar support device

(57) A seat, in particular for a vehicle, has a back member (11) which includes a frame (12), a back cushion (17), a lumbar-support plate (20) on the cushion (17) movable in a forward or rearward direction under the control of a cam (23) rigid with a rotary support shaft (21), a locking device (24) including a ratchet member (25) securing the shaft in any one of, for example, five rotational positions.



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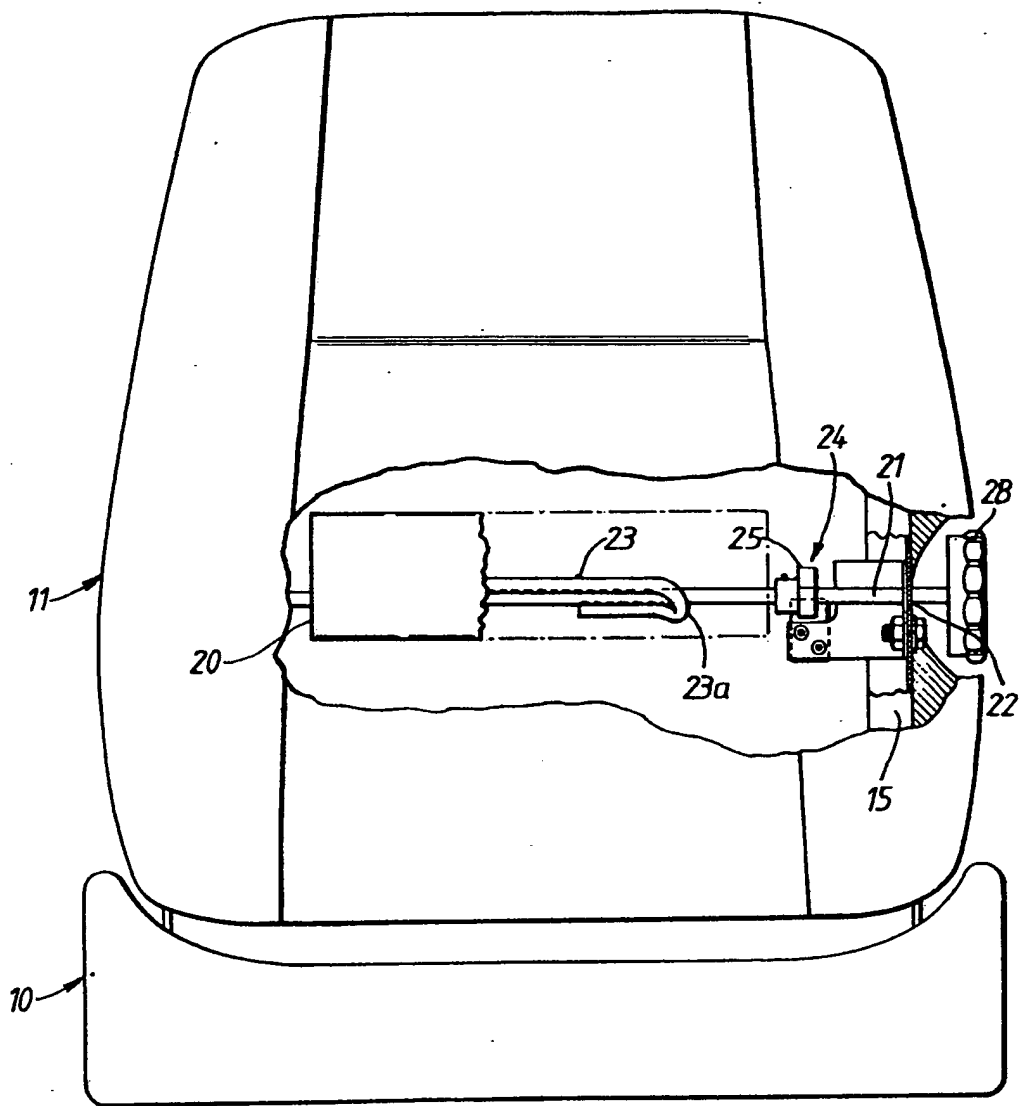
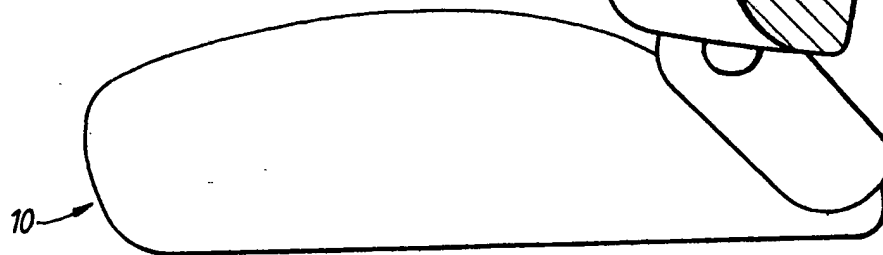
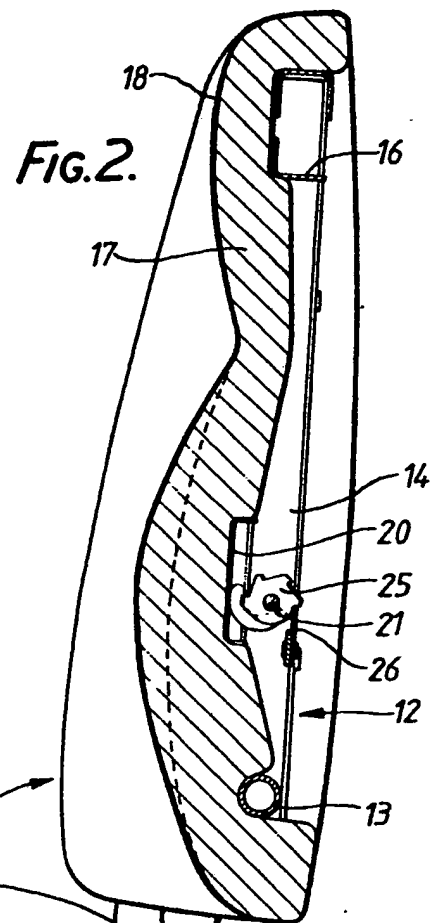
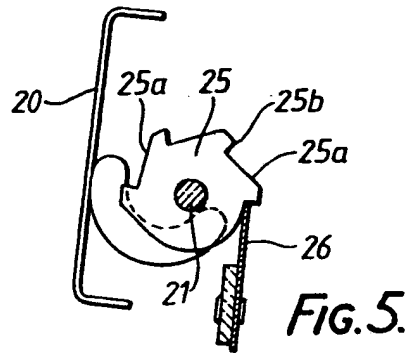
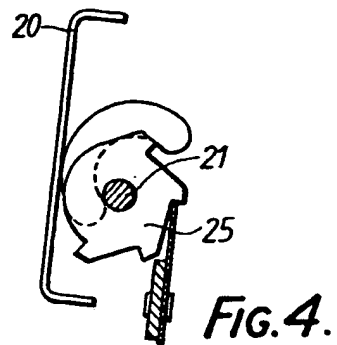
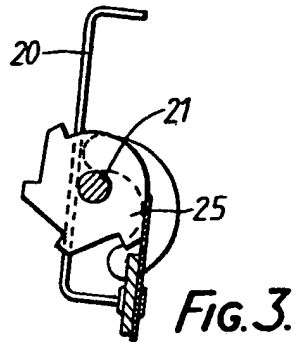


FIG. 1.



SPECIFICATION

A seat with a movable lumbar support device

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This invention relates to a seat with a movable lumbar-support device, and in particular to such a seat for use in a vehicle.

- 10 A requirement exists for a vehicle seat with a lumbar support device of simple yet robust construction which is easy to operate and inexpensive to manufacture.

- According to the present invention there is provided a seat comprising a seat member and a back member, the back member comprising a frame, a cushion supported on the frame, a lumbar support plate attached to the cushion in the lumbar region of the back member, a lumbar support shaft mounted for rotation on the frame and extending across said lumbar region, a cam secured to the shaft for rotation therewith and contacting said lumbar support plate such that the load of the seat occupant applied by the lumbar support plate to the cam acts along a line passing through or close to the axis of said shaft, and a shaft locking device comprising a ratchet member and a pawl member in engagement therewith, one of said members rotatable with the shaft and the other secured to said frame, and manually operable means for rotating the shaft into any one of a plurality of discrete stable positions each corresponding to a different spacing of the lumbar support plate from the axis of the lumbar support shaft.

- By locating the line of action of the seat occupant load through or close to the axis of the lumbar-support shaft, little or no moment of the force will occur about the axis of the shaft and hence little if any of this force will act on the shaft locking device.

- One embodiment of a vehicle seat in accordance with the invention will now be particularly described by way of example with reference to the accompanying drawings in which:

- Figure 1 is a vertical section through a seat according to the invention;

- Figure 2 is a plan view, part sectioned, of the back member of the seat; and

- Figures 3,4 and 5 are scrap views on an enlarged side showing different positions of the lumbar support shaft and the shaft locking device. 8As shown in the drawings, the seat comprises a seat member 10, a back member 11 connected to the seat member. The back member comprises a frame 12 which includes a lower transverse bar 13, upright channel-section bars 14,15 and an upper transverse box-section bar 16 interconnected at their ends. Supported on the frame is a shaped cushion 17 having a suitable durable cover 18 and a lumbar support plate 20, for example of trough shape, secured to the rearward face of the cushion, for example by insert moulding of

the cushion around the plate. The plate 20 extends across the lumbar region of the back member 11.

- Also extending across the lumbar-region is a lumbar-support shaft 21 journaled in bearings 22 (only one seen in Figure 1) in the upright bars 14,15. A handle 23 is secured to one outer end of the shaft forming manually operable means for rotating the shaft.

- At a position on the shaft 21 opposite the lumbar support plate 20, a bar 23 shaped by having its ends bent inwardly is rigidly secured to the shaft 21 so that the bent portions 23a of the bar (only one end seen in Figure 1), and the portion between the bent ends form a cam secured to the shaft and in engagement with the rearward face of the lumbar-support plate 20.

- The profile of the bent portions 23a of the bar 23, as seen from one end of the shaft 21, is that of a slow rise/fast drop cam. Accordingly, upon rotation of the shaft in the anti-clockwise direction as seen in figure 2, the sliding movement of the cam-shaped bar 23 against the lumbar support plate 20, progressively moves the lumbar support plate 20 away from the axis of the shaft 21 until the end of the cam profile of the bar 23 is reached, whereupon the plate 20 is free to move rearwardly to a zero lift position.

- The point of contact between the cam-forming bar 23 and the lumbar support plate 20 is so located that when the load of the seat occupant's back is applied to the back cushion in the lumbar region, the line of action of this force through the point of contact between the bar 23 and the lumbar support plate 20 passes through or close to the axis of the shaft 21 and so applies little if any torque to the shaft.

- A locking device 24 for locking the shaft in any one of a plurality of discrete selected rotational positions (see Figures 3,4 and 5) comprises a ratchet disc 25 formed with a number, for example five, of flats 25a, at least some of which are separated by steps 25b, and a pawl 26 secured to the frame and in engagement with the periphery of the disc 25.

- Figures 3,4, and 5 illustrate three of the five positions of the cam corresponding with positions of engagement of the pawl with the ratchet disc 25 and showing the different spacing between the lumbar support plate 20 and the axis of shaft 21 in the different rotational positions of the ratchet disc 25. The ratchet disc 25 is rotatable only in the anti-clockwise direction shown in figures 3,4, and 5 from a zero lift position shown in figure 3 to a maximum lift position shown in figure 5.

- If the shaft is rotated beyond the fifth position of figure 5, the cam becomes disengaged from the lumbar support plate 20 and the latter is free to drop back into engagement with the shaft as shown in figure 3.

- By making the line of action of the load of

the seat occupant against the back member 11 through the position of contact of the cam bar 23 with the plate 20, pass through or close to the axis of the shaft 21, so that little if any torque is applied to the shaft by this load, the locking device can be of relatively lightweight and inexpensive construction since it will carry little, if any, of this load.

10 CLAIMS

1. A seat comprising a seat member and a back member, the back member comprising a frame, a cushion supported on the frame, a lumbar support plate attached to the cushion in the lumbar region of the back member, a lumbar support shaft mounted for rotation on the frame and extending across said lumbar region, a cam secured to the shaft for rotation therewith and contacting said lumbar support plate such that the load of the seat occupant applied by the lumbar support plate to the cam acts along a line passing through or close to the axis of said shaft, and a shaft locking device comprising a ratchet member and a pawl member in engagement therewith, one of said members rotatable with the shaft and the other secured to said frame, and manually operable means for rotating the shaft into any one of a plurality of discrete stable positions each corresponding to a different spacing of the lumbar support plate from the axis of the lumbar support shaft.

2. A seat according to claim 1 wherein the cam is formed by a bar secured along the shaft, the shaft bent at its opposite ends to the profile of a slow rise/fast drop cam.

3. A seat according to claim 1 wherein the locking device comprises a rotor mounted on the shaft, the rotor having a plurality of flats thereon at least some of which terminate in a step, and a pawl secured to the frame and cooperating with the rotor to permit continuous rotation of the shaft in only one direction.

4. A seat having a movable lumbar support device substantially as herein described with reference to the accompanying drawing.